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Indian Standard

SPECIFICATION FOR SODIUM HYDROXIDE FOR COSMETIC INDUSTRY

(First Revision)

UDC 546·33-36 : 665·58

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Gr 5

November 1987

Indian Standard

SPECIFICATION FOR SODIUM HYDROXIDE FOR COSMETIC INDUSTRY

(*First Revision*)

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(*Continued on page* 19)

Indian Standard

SPECIFICATION FOR SODIUM HYDROXIDE FOR COSMETIC INDUSTRY

(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards on 10 May 1987, after the draft finalized by the Cosmetics Sectional Committee had been approved by the Petroleum, Coal and related Products Division Council.

0.2 In the original version of this standard, the requirements of sodium hydroxide for cosmetic industry were identified from the existing IS : 252-1973* and IS : 376-1976† and published as a separate standard to assist the cosmetic manufacturers to procure the material of the requisite quality.

0.3 Through use of this standard, it has been transpired that sodium hydroxide, liquid form (lye) rather than the solid material is largely used. Accordingly in this revision, sodium hydroxide liquid form has also been included.

0.3.1 In normal handling and storage of sodium hydroxide, due to the presence of moisture and atmospheric carbon dioxide, carbonates are formed. Sodium carbonate along with the resultant sodium hydroxide of lower assay is acceptable to the cosmetic industry as a mild neutralizing agent. The Committee has, therefore, in this revision, reduced sodium hydroxide percent by mass *Min*, from 99·5 percent to 97 percent and increased the limit of carbonates (as Na_2CO_3) from 0·40 percent to 2·5 percent. The Committee also considered contamination of the material with mercury but detailed investigations revealed that the chances of this impurity are remote and hence this requirement has also been deleted in this revision.

0.3.2 Since the concentration of sodium hydroxide in liquid form (lye) is dependent on the requirement of the user, provision has been made in this standard for mutual agreement on this aspect.

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*Specification for caustic soda, pure and technical (*second revision*).

†Specification for sodium hydroxide, analytical reagent (*second revision*).

0.4 For the purpose of deciding, whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard prescribes the requirements and the methods of sampling and test for sodium hydroxide for cosmetic industry.

2. REQUIREMENTS

2.1 Form and Description — The material shall be supplied in the solid form (including flakes and pellets) or liquid form.

2.1.1 The material shall be free from foreign matter, dirt or other visible impurities.

2.2 The material shall comply on dry basis with the requirements given in Table 1, when tested according to the methods prescribed in Appendix A. Reference to the relevant clauses of Appendix A is given in col 4 of Table 1.

3. PRECAUTIONS IN HANDLING AND STORING

3.1 The precautions in handling and storing as given in IS : 4264-1967† shall be observed.

4. PACKING AND MARKING

4.1 Packing — The material shall be packed in polyethylene bags or polyethylene lined gunny bags, or as agreed to between the purchaser and the supplier.

4.2 Marking — Each container shall be securely closed and shall bear legibly and indelibly the following information:

a) Name and form of the material;

b) Name of the manufacturer and/or his recognized trade-mark, if any;

c) Net mass of the material;

d) Year of manufacture; and

e) Lot number, in code or otherwise, to enable the date of manufacture to be traced from records.

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*Rules for rounding off numerical values (*revised*).

†Code of safety for caustic soda.

TABLE 1 REQUIREMENTS FOR SODIUM HYDROXIDE FOR COSMETIC INDUSTRY

(*Clause* 2.2)

Sl No.	Characteristic	Requirement*	Method of Test, Ref to Clause No. in Appendix A
(1)	(2)	(3)	(4)
i)	Sodium hydroxide (as NaCH), percent by mass, *Min*	97·0	A-3
ii)	Carbonates (as Na_2CO_3), percent by mass, *Max*	2·5	A-4
iii)	Chlorides (as NaCl), percent by mass, *Max*	0·10	A-5
iv)	Sulphates (as Na_2SO_4), percent by mass, *Max*	0·10	A-6
v)	Arsenic (as As_2O_3), ppm, *Max*	2	A-7
vi)	Heavy metals (as Pb), ppm, *Max*	20	A-8
vii)	Iron (as Fe_2O_3), ppm, *Max*	20	A-9
viii)	Matter insoluble in water, percent by mass, *Max*	0·05	A-11

NOTE 1 — In cosmetic industry, sodium hydroxide manufactured by diaphragm cell process preferably should be used.

NOTE 2 — In case of sodium hydroxide in liquid form, the concentration of sodium hydroxide in lye shall be as agreed to between the purchaser and the supplier.

*All the requirements are on dry basis.

4.2.1 The containers shall be marked with the following caution note:

'CORROSIVE—HANDLE WITH CARE'

and appropriate label to indicate the possible corrosion hazards [*see* IS : 1260 (Part 1)-1973*].

4.2.2 The containers may also be marked with the Standard Mark.

NOTE — The use of the Standard Mark is governed by the provisions of the Bureau of Indian Standards Act, 1986 and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuouly checked by BIS for conformity to that standard as a further safeguard. Details of conditions, under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

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*Pictorial markings for handling and labelling of goods: Part 1 Dangerous goods (*first revision*).

5. SAMPLING

5.1 The procedure for drawing representative samples of the material and the conformity of the material to the requirements of the specification shall be determined according to the procedure prescribed in Appendix B.

6. TEST METHODS

6.1 The material shall be tested in accordance with the methods prescribed in Appendix A, as indicated in col 4 of Table 1.

6.2 Calculation of Results on Dry Basis — In **A-3** to **A-9** and **A-11**, results have been calculated on the basis of the material as received. To calculate the results on the dry basis as specified in Table 1, the method given in **A-10** shall be adopted.

APPENDIX A

(*Clauses* 2.2 *and* 6.2)

METHODS OF TEST FOR CAUSTIC SODA FOR COSMETIC INDUSTRY

A-1. QUALITY OF REAGENTS

A-1.1 Unless specified otherwise, pure chemicals and distilled water (*see* IS : 1070-1977*) shall be used in tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the results of analysis.

A-2. PREPARATION OF TEST SOLUTION

A-2.1 In a weighing bottle with a ground-glass stopper, weigh to the nearest 0·01 g, a little less than 50 g of caustic soda. Dissolve the material in approximately 200 ml of water and cool it to room temperature; transfer the solution quantitatively to a 500-ml volumetric flask and dilute nearly to the mark, recool, then dilute up to the mark and mix thoroughly. The solution thus prepared shall be used for subsequent tests.

A-3. DETERMINATION OF SODIUM HYDROXIDE

A-3.1 Reagents

A-3.1.1 *Standard Hydrochloric Acid* — 1 N.

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*Specification for water for general laboratory use (*second revision*).

A-3.1.2 *Methyl Orange Indicator Solution* — Dissolve 0·1 g of methyl orange in 100 ml of water.

A-3.2 Procedure—Transfer exactly 20 ml of the sample solution (*see* **A-2**) to a 500-ml conical flask. Add approximately 80 ml of water and 5 drops of methyl orange indicator solution and titrate it against standard hydrochloric acid until the colour of the indicator changes from yellow to orange.

A-3.3 Calculation

$$\text{Total alkalinity, percent by mass, } B = \frac{V \times N}{M} \times 99{\cdot}992\,5$$

where

V = volume in ml of standard hydrochloric acid solution used for titration,

N = normality of standard hydrochloric acid solution, and

M = mass in g of the material taken for the test.

$$\text{Sodium hydroxide (as NaOH), percent by mass} = B - A \times \frac{40}{53}$$

where

B = total alkalinity, and

A = carbon dioxide content (as Na_2CO_3) calculated as per **A-4**.

A-4. DETERMINATION OF CARBONATES

A-4.0 Two methods, namely, Method A — Double Indicator Method and Method B — Gasometric Method have been prescribed. Method A shall be used for routine analysis and Method B shall be used as a refree method.

A-4.1 Method A (Double Indicator Method)

A-4.1.1 *Reagents*

A-4.1.1.1 *Standard hydrochloric acid* — 1 N.

A-4.1.1.2 *Standard hydrochloric acid* — 0·1 N.

A-4.1.1.3 *Methyl orange indicator solution* — *see* **A-3.1.2**.

A-4.1.1.4 *Phenolphthalein indicator solution* — Dissolve 0·1 g of phenolphthalein powder in 60 ml of rectified spirit (conforming to IS : 323-1959)* and dilute with water to 100 ml.

---

*Specification for rectified spirit (*revised*).

A-4.1.2 *Procedures*—Pipette out 25 ml of the test solution (*see* **A-2**) into a conical flask and add 2 to 3 drops of phenolphthalein indicator. Titrate it against standard hydrochloric acid solution (1 N) up to a little before the end point. Further titrate it against standard hydrochloric acid (0·1 N) till the pink colour just disappears. Take this reading as B. Then add 2 to 3 drops of methyl orange indicator and continue titration against standard hydrochloric acid (0·1 N) to a reddish orange colour. Take this reading as C.

A-4.1.3 *Calculation*

$$\text{Carbonate (as } Na_2CO_3 \text{), percent by mass} = \frac{212\ (\ C - B\ ) \times N}{M}$$

where

N = normality of standard hydrochloric acid (0·1), and
M = mass of the material taken for test.

A-4.2 Method B (Gaseometric Method)

A-4.2.0 *Principle* — The method involve the measurement of volume of carbon dioxide evolved from a portion of the test sample by reaction with hydrochloric acid solution.

A-4.2.1 *Reagents*

A-4.2.1.1 *Distilled water, or water of equivalent purity, free from carbon dioxide at room temperature* — Eliminate any carbon dioxide present either by boiling water for 10 minutes and cooling it in the absence of atmospheric carbon dioxide or, more simply, by bubbling air free from carbon dioxide through it for 15 minutes. Free the air from carbon dioxide by passing it through a column containing pellets of sodium hydroxide. Store it in the absence of atmospheric carbon dioxide.

A-4.2.1.2 *Concentrated hydrochloric acid* — *see* IS : 265-1976*.

A-4.2.1.3 *Sodium chloride, coloured acid solution* — Dissolve 26 g of sodium chloride in water. Add 5 ml of sulphuric acid solution (relative density = 1·83). Dilute it to 1 000 ml, add a small amount of 0·05 percent methyl orange indicator solution and mix thoroughly.

A-4.2.1.4 *Sodium hydroxide solution* — 6 N.

A-4.2.2 *Apparatus* — Apparatus as assembled is shown in Fig. 1.

A-4.2.3 *Procedure*

A-4.2.3.1 Weigh, to the nearest 0·01 g, about 10 g of caustic soda.

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*Specification for hydrochloric acid (*second revision*).

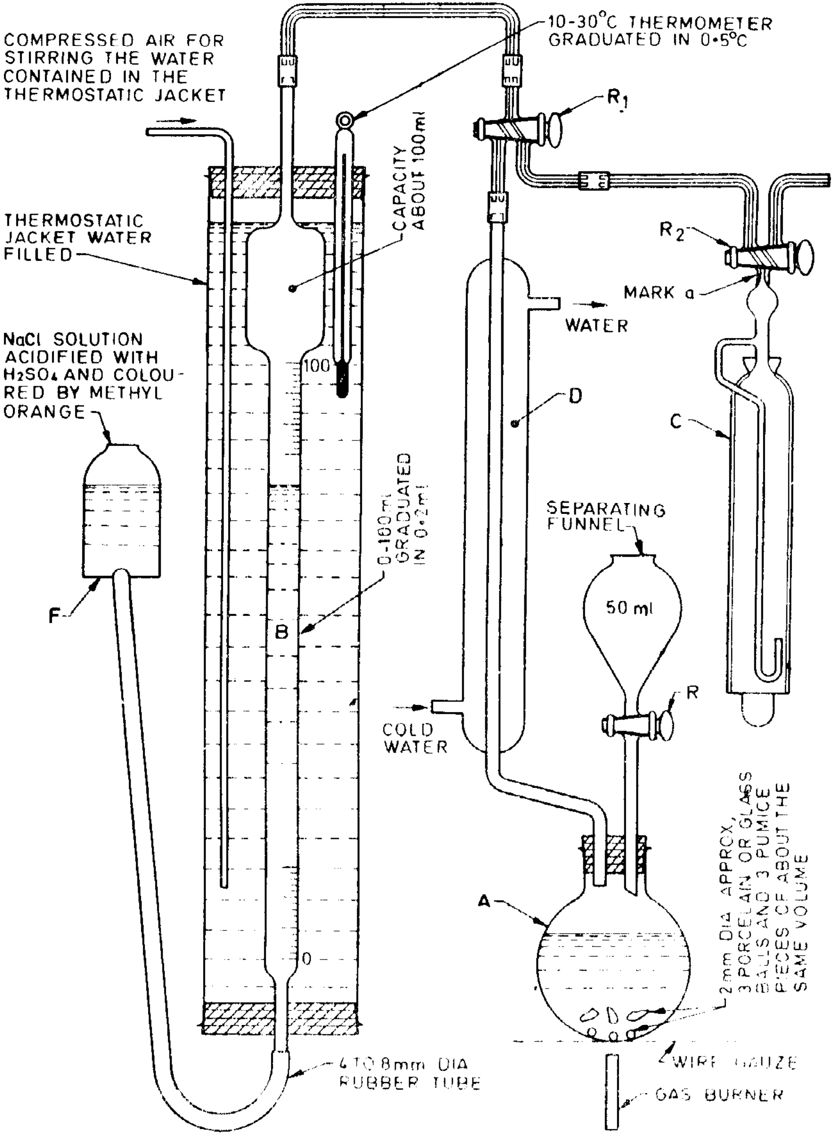
COMPRESSED AIR FOR STIRRING THE WATER CONTAINED IN THE THERMOSTATIC JACKET
10-30°C THERMOMETER GRADUATED IN 0.5°C
R_1
CAPACITY ABOUT 100 ml
THERMOSTATIC JACKET WATER FILLED
R_2
MARK a
WATER
NaCl SOLUTION ACIDIFIED WITH H_2SO_4 AND COLOURED BY METHYL ORANGE
100
D
C
0-100 ml GRADUATED IN 0.2 ml
SEPARATING FUNNEL
50 ml
F
B
R
COLD WATER
2 mm DIA APPROX, 3 PORCELAIN OR GLASS BALLS AND 3 PUMICE PIECES OF ABOUT THE SAME VOLUME
A
0
WIRE GAUZE
4 TO 8mm DIA RUBBER TUBE
GAS BURNER

FIG. 1 ASSEMBLY OF APPARATUS FOR DETERMINATION OF CARBONATES

A-4.2.3.2 *Assembling the apparatus* — Fill burette, B of the apparatus with the coloured acid solution through levelling bottle, F. Pour into absorber C some of the sodium hydroxide solution. (Renew this solution after 100 determinations). With burette B and absorber C filled up to cock R_1 and graduation mark a respectively, and cocks R_1 and R_2 closed, place the test portion in flask A and, in the case of solid material, dissolve it in approximately 30 ml of water. Dilute to approximately 40 ml so as to reduce the dead space to a volume slightly greater than 100 ml (volume above the level of the liquid in flask A plus the volume of condenser tube D up to cock R). Place in the flask three porcelain or glass balls, about 2 mm in diameter, and a few pieces of pumice having a total volume approximately equal to that of the balls Stopper the flask and close cock R. Connect flask A with burette B through cock R_1 and lower the levelling bottle F. Check the tightness of the apparatus by appropriately handling the cocks and the levelling bottle.

A-4.2.3.3 *Evolution and measurement of carbon dioxide* — By means of a separating funnel, pour 35 ml of the hydrochloric acid solution into flask A taking care to avoid loss of gas. The acidity of the solution in flask is thus approximately 2 N after the evolution of carbon dioxide. Heat the flask and maintain the solution at boiling point for 5 minutes while running cold water through the condenser. Then stop heating and add more of the coloured acid solution by means of the separating funnel, lowering the levelling bottle F still further to make the solution in the flask A rise in the condenser tube up to cock R_1. Then close the latter and wait for 5 minutes to allow the gas to reach the temperature of the water jacket. Measure the volume of gas V at atmospheric pressure P and at the temperature t of the water in the jacket. For this purpose. move the levelling bottle F to bring the coloured acid solution to the same level both in the flask and in the burette B; read the volume of the latter. Adjust the cocks R_1 and R_2 so that the burette B and absorber C are connected, then raise the levelling bottle F so that the gas is transferred to the absorber where the carbon dioxide is absorbed. Then transfer the non-absorbed gas back to burette B by lowering the levelling bottle F and, after adjusting the level of the sodium hydroxide solution to the gauge mark a on absorber C, close cock R_2 and read the volume of the residual gas. Repeat these operations until a constant volume V_1 is obtained. The difference in the volume, $V - V_1$, represents the carbon dioxide contained in the test portion, measured at atmospheric pressure and at the temperature of the water jacket.

A-4.2.4 *Calculation*

$$\text{Carbonates (as Na}_2\text{CO}_3\text{), percent by mass, } A = 0{\cdot}170 \times \frac{P - p}{275 + t} \times \frac{V - V_1}{M}$$

where

P = atmospheric pressure in mm Hg at the time of determination,

p = vapour pressure in mm Hg of the coloured acid solution at the temperature of the water contained in the jacket,

t = temperature in °C of the water contained in the water jacket,

V = volume in ml of gas before absorption of carbon dioxide,

V_1 = volume in ml of gas after absorption of carbon dioxide, and

M = mass in g of the material taken for the test.

A-5. DETERMINATION OF CHLORIDES

A-5.1 Reagents

A-5.1.1 *Concentrated Nitric Acid — see* IS : 264-1976*.

A-5.1.2 *Standard Silver Nitrate Solution* — 0·1 N.

A-5.1.3 *Nitrobenzene*

A-5.1.4 *Standard Ammonium Thiocyanate Solution* — 0·1 N.

A-5.1.5 *Ferric Ammonium Sulphate Indicator* — saturated solution.

A-5.2 Procedure—Weigh accurately about 15 g of the material, dissolve it in about 50 ml distilled water. Neutralize the solution with concentrated nitric acid and then add 5 ml of the acid in excess. Add 5 ml of nitrobenzene and shake vigorously; pipette into this 20 ml of standard silver nitrate solution. Titrate it against standard ammonium thiocyanate solution using ferric ammonium sulphate indicator.

A-5.3 Calculation

$$\text{Chlorides (as NaCl), percent by mass} = \frac{5{\cdot}845\,(20N_1 - V_1N_2)}{M}$$

where

N_1 = normality of standard silver nitrate solution,

N_2 = normality of standard ammonium thiocyanate solution,

V_1 = volume in ml of standard ammonium thiocyanate solution used in **A-5.2**, and

M = mass in g of the material taken for the test in **A-5.2**.

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*Specification for nitric acid (*second revision*).

A-6. DETERMINATION OF SULPHATES

A-6.1 Reagents

A-6.1.1 *Concentrated Hydrochloric Acid — see* IS : 265-1976*.

A-6.1.2 *Barium Chloride Solution* — 10 percent.

A-6.2 Procedure — Weigh accurately about 10 g of the material and dissolve it in 100 ml of water. Add sufficient quantity of concentrated hydrochloric acid to neutralize and leave an excess of acid in the solution. Boil it to decompose the carbonates; Filter the resulting solution through a folded filter paper thoroughly, collecting both the filtrate and washings, in 500-ml beaker. Dilute it to 250 ml, boil and add 10 ml of hot barium chloride solution to the boiling solution. Boil it again for 2 minutes; let it stand for 4 hours, and then filter through a tared sintered glass crucible (G No. 4) or a tared Gooch crucible. Wash the precipitate to make it free from chlorides and dry to constant mass at 105 to 110°C.

A-6.2.1 Excess barium chloride is necessary to reduce the solubility of barium sulphate. Precipitation in hot solution by the addition of barium chloride in a slow stream with stirring minimizes the mechanical occlusion of barium chloride and gives a coarse precipitate which is less soluble in acids.

A-6.3 Calculation

$$\text{Sulphates (as } Na_2SO_4 \text{), percent by mass} = 60.86 \frac{M_1}{M}$$

where

M_1 = mass in g of the precipitate, and

M = mass in g of the material taken for the test.

A-7. DETERMINATION OF ARSENIC

A-7.1 Reagents

A-7.1.1 *Concentrated Hydrochloric Acid — see* IS : 265-1976*.

A-7.1.2 *Stannous Chloride Solution* — Dissolve 40 g of stannous chloride in 100 ml concentrated hydrochloric acid. Boil to obtain clear solution. Discard the solution if an appreciable deposit forms.

A-7.1.3 *Brominated Hydrochloric Acid* — Mix 1 ml of bromine solution with 100 ml of concentrated hydrochloric acid.

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*Specification for hydrochloric acid (*second revision*).

A-7.2 Procedure — Dissolve 1·0 g of the material in 50 ml of water, add 16 ml of brominated hydrochloric acid and remove excess bromine with a few drops of stannous chloride solution. Transfer quantitatively to the Gutzeit bottle and carry out the test for arsenic as prescribed in IS : 2088-1983*, using for comparison a stain produced with 0·002 mg of arsenic trioxide.

A-8. DETERMINATION OF HEAVY METALS

A-8.1 Apparatus

A-8.1.1 *Nessler Cylinders* — 50-ml capacity (*see* IS : 4161-1967†).

A-8.2 Reagents

A-8.2.1 *Dilute Hydrochloric Acid* — approximately 5 N.

A-8.2.2 *Phenolphthalein Indicator Solution* — same as in **A-4.1.1.4**.

A-8.2.3 *Dilute Ammonium Hydroxide* — approximately 5 N.

A-8.2.4 *Dilute Acetic Acid* — approximately 1 N.

A-8.2.5 *Hydrogen Sulphide Solution* — saturated.

A-8.2.6 *Standard Lead Solution* — Dissolve 1·6 g of lead nitrate in water and make up the solution to 1 000 ml. Pipette out 10 ml of the solution and dilute again to 1 000 ml with water. One millilitre of this solution contains 0·01 mg of lead (as Pb).

A-8.3 Procedure — Dissolve 1 g of the material in 5 ml of water and 1 ml of dilute hydrochloric acid. Heat to boiling, add 1 drop of phenolphthalein indicator solution and add sufficient dilute ammonium hydroxide dropwise to obtain a faint pink colour. Add 2 ml of dilute acetic acid and dilute to 25 ml with water. Transfer the solution to Nessler cylinder.

In the second Nessler cylinder, add 2 ml of dilute acetic acid, 2 ml of standard lead solution and make up the volume to 25 ml. Add 10 ml of hydrogen sulphide solution to each Nessler cylinder and make up the volume to 50 ml with water. Mix, allow to stand for 10 minutes and then compare the colour produced in the two Nessler cylinders.

A-8.3.1 The material shall be considered to have not exceeded the limit prescribed in Table 1 if the colour of the test solution is not darker than that of standard lead solution when viewed downwards over a white surface.

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*Methods for determination of arsenic (*second revision*).

†Specification for Nessler cylinders.

A-9. DETERMINATION OF IRON

A-9.1 Apparatus

A-9.1.1 *Nessler Cylinders — 100-ml capacity* (*see* IS : 4161-1967*).

A-9.2 Reagents

A-9.2.1 *Concentrated Hydrochloric Acid — see* IS : 265-1976†.

A-9.2.2 *Ammonium Persulphate*

A-9.2.3 *Potassium Thiocyanate Solution* — approximately 5 percent.

A-9.2.4 *Standard Iron Solution* — Dissolve 0·702 g of ferrous ammonium sulphate [$FeSO_4\,(NH_4)_2\,SO_4.6H_20$] in 100 ml distilled water. Add 10 ml of concentrated sulphuric acid and dilute with water to 1 000 ml mark. Transfer 100 ml of this solution to a 1 000 ml volumetric flask and dilute again to 1 000-ml mark. One millilitre of this solution is equivalent to 0·01 mg of iron (as Fe).

A-9.3 Procedure — Transfer by means of pipette 25-ml of the test solution (*see* **A-2.1**), dilute to 50 ml and make acidic with concentrated hydrochloric acid Add 30 mg of ammonium persulphate and boil to oxidize the iron. Cool and transfer to a Nessler cylinder, add 2 ml of potassium thiocyanate solution and dilute to 100-ml mark with water. In another Nessler cylinder, take the same amounts of concentrated hydrochloric acid, ammonium persulphate and potassium thiocyanate solution, as used with the material and dilute to about 85 ml. From a burette, add standard iron solution in small portions at a time so that after dilution to 100 ml, the colour obtained matches with that obtained with the material.

A-9.4 Calculation

$$\text{Iron (as Fe), ppm} = \frac{200\,V}{M}$$

where

V = volume in ml of standard iron solution used in **A-9.3**, and

M = mass in g of the material taken for the preparation of test solution (*see* **A-2.1**).

A-10. CALCULATION OF RESULTS

A-10.1 For the purpose of this standard, add the percentage of sodium hydroxide, carbonates (as Na_2CO_3), chlorides (as NaCl), sulphates

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*Specification for Nessler cylinders.

†Specification for hydrochloric acid (*second revision*).

(as Na_2SO_4) and matter insoluble in water, for exmple, silicates (as SiO_2) and treat the total as the total dry solid content of the solution. On this basis, calculate the contents of different components on dry basis.

A-10.1.1 *Example* — If the total percentage of determined components of a solution is 50·4 and the percentage of sodium hydroxide content is 50·2, the percentage of sodium hydroxide on dry basis will be:

$$\frac{50{\cdot}2 \times 100}{50{\cdot}4} = 99{\cdot}6$$

Again in the above example, if the iron content is 10 ppm, the content of iron on dry basis will be:

$$\frac{10 \times 100}{50{\cdot}4} = 19{\cdot}8 \text{ ppm}$$

A-11. DETERMINATION OF MATTER INSOLUBLE IN WATER

A-11.1 Reagent

A-11.1.1 *Concentrated Hydrochloric Acid* — *see* IS : 265-1976*.

A-11.2 Procedure — Weigh accurately about 50 g of the material, transfer it into a 600-ml beaker, add 300 ml of water and stir until it is dissolved. Add concentrated hydrochloric acid till the solution is just alkaline to phenolphthalein. Bring to boil and allow the solution to settle on the hot-plate for 15 minutes. Filter through a weighed Gooch crucible or tared sintered glass crucible (G No. 4) and wash with hot water to free it from alkali allowing water to drain completely after each washing. Dry it in an oven for one hour at 105 to 110°C. Cool it in a desiccator and weigh.

A-11.3 Calculation

$$\text{Matter insoluble in water, percent by mass} = 100\,\frac{M_1}{M}$$

where

M_1 = mass in g of the insoluble residue, and

M = mass in g of the material taken for the test.

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*Specification for hydrochloric acid (*second revision*).

APPENDIX B

(*Clause* 5.1)

SAMPLING OF CAUSTIC SODA FOR COSMETIC INDUSTRY

B-1. GENERAL REQUIREMENTS OF SAMPLING

B-1.1 Precautions shall be taken to protect the samples, the material being sampled, the sampling instrument and the containers for samples from adventitious contamination, particularly from absorption of water and carbon dioxide.

B-1.2 To draw a representative sample, the contents of each container selected from sampling shall be mixed thoroughly by suitable means.

B-1.3 The sample shall be placed in clean, dry and air-tight alkali resistant glass containers.

B-1.4 Each sample container shall be sealed air-tight after filling, and marked with full details of sampling, date of sampling and the batch number.

B-2. SCALE OF SAMPLING

B-2.1 Lot — All the containers in a single consignment of the material drawn from a single batch of manufacture shall constitute the lot. If a consignment is declared to consist of different batches of manufacture, the batches shall be marked separately and the groups of containers in each batch shall constitute separate lots.

B-2.2 Samples shall be tested from each lot separately for judging the conformity of the material to the specified requirements. The number of containers (n) to be selected at random from the lot shall depend on the size of the lot (N) and shall be in accordance with Table 2.

TABLE 2 NUMBER OF CONTAINERS TO BE SELECTED FOR SAMPLING

Lot Size N (1)	Number of Containers to be Selected n (2)
Up to 50	3
51 ,, 200	4
201 ,, 400	5
401 ,, 650	6
651 ,, 1 000	7
1 001 and above	8

B-2.3 These containers shall be selected at random from the lot. In order to ensure the randomness of selection, reference may be made to IS : 4905-1968*. In case this standard is not readily available, the following procedure may be adopted.

> 'Starting from any container in the lot count them as 1, 2 .... up to *r* and so on, where *r* is the integral part of *N*/*n*. Every *r*th container thus counted shall be withdrawn till the requisite number of containers is obtained.'

B-3. TEST SAMPLES AND REFEREE SAMPLE

B-3.1 Caustic Soda Solid

B-3.1.1 Scrape off 50 mm of the material from the top centre and then take the sample. The quantity of the material so drawn shall be not less than 200 g and the mass of the total material taken out shall not exceed 1 kg. The number of portions to be collected and the quantity of material taken from each portion may be suitably reduced in the case of big containers to keep the size of the material taken out at 1 kg. Mix rapidly the material so collected from any particular container on a clean dry surface after scraping off the surface carbonate that may be formed during sampling.

B-3.1.2 From each of the portions representing the containers selected, take out 600 g and mix thoroughly the material collected. This shall constitute the composite sample. Divide this composite sample into three parts, transfer each part to a sample container which shall then be sealed air-tight with well-fitting corks coated with paraffin wax.

B-3.2 Caustic Soda Lye

B-3.2.1 Draw representative portions from each container selected from sampling after thoroughly mixing the container; take out about 2 litres from each selected container.

B-3.2.2 From each of the portions representing the selected containers, take out about 200 ml and mix the material so obtained. This shall constitute the composite sample. Divide this composite sample into three parts, one for the purchaser, another for the supplier and the third for the referee. Transfer each part to a sample container which shall then be closed as in **B-3.1.2**.

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*Methods for random sampling.

B-3.3 Referee Sample — The referee sample (*see* **B-3.1.2**, **B-3.2.1** and **B-3.2.2**) shall bear the seals of the purchaser and the supplier and shall be used in case of a dispute between the two. It shall be kept at a place agreed to between the purchaser and the supplier.

B-4. NUMBER OF TESTS

B-4.1 Tests for all the characteristics shall be conducted on the composite sample.

B-5. CRITERIA FOR CONFORMITY

B-5.1 The lot shall be considered conforming to the requirements of the standard if all the test results on the composite sample meet the corresponding specified requirements.

Members	*Representing*
Shri V. R. Rathi	Sudershan Chemical Industries Ltd, Pune
Shri U. N. Limaya (*Alternate*)	
Shri L. V. Raykar	Food & Drug Administration, Maharashtra State, Bombay
Dr S. K. Roy	Central Drugs Laboratory, Calcutta
Dr A. C. Das Gupta (*Alternate*)	
Dr M. P. Sahakari	Italab Pvt Ltd, Bombay
Shri M. R. Parekh (*Alternate* I)	
Shri K. S. Santhanam (*Alternate* II)	
Dr N. D. Shah	Geoffrey Manners & Co Ltd, Bombay
Dr M. M. Doshi (*Alternate*)	
Shri Navinchandra R. Shah	Devarsons Pvt Ltd, Ahmadabad
Shri Vinodchandra K. Mehta (*Alternate*)	
Shri M. S. Thakur	Godrej Soaps Ltd, Bombay
Shri N. G. Iyer (*Alternate*)	

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

Quantity	*Unit*	*Symbol*
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	*Unit*	*Symbol*
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	*Unit*	*Symbol*	*Definition*
Force	newton	N	1 N = 1 kg.m/s^2
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m^2